

I. The Drawings Satisfy All Formal Requirements

The Office Action objects to the drawings as not showing every feature of the claims. The objection is respectfully traversed.

Specifically, the Office Action asserts that the recitation of the "displacement created between the outer surface of the shaft and the inner surface of the inner ring abutting the outer surface of the shaft" is not shown in the figures. This assertion is traversed since this feature is specifically shown in Figs. 1 and 2. For example, the claimed displacement between the shaft 11 and the inner race 9b is created by the retainer ring 12.

For at least these reasons, it is respectfully submitted that the drawings satisfy all formal requirements. Withdrawal of the objection to the drawings is respectfully requested.

II. The Claims Satisfy the Requirements of 35 U.S.C. §112

The Office Action rejects claims 3 and 4 under 35 U.S.C. §112, first paragraph; and claims 3 and 4 under 35 U.S.C. §112, second paragraph. The rejections are respectfully traversed.

Specifically, in accordance with the claimed blower, inner races 8b, 9b of the two ball bearings 8, 9 are smaller than their outer races 8a, 9a, and a clearance L3 can be obtained between the inner races 8b, 9b. The outer races contact each other when the ball bearings are inserted in a bearing box, but the inner races do not contact each other. As a result, the ball bearings rotate about their contact portions. Thus, the ball bearings are fixed in a position where the coaxiality relative to the shaft is the smallest, as disclosed at page 2, line 33 – page 3, line 8.

For at least these reasons, it is respectfully submitted that the claims satisfy the requirements of 35 U.S.C. §112, first and second paragraphs. Withdrawal of the rejections under 35 U.S.C. §112, first and second paragraphs, is respectfully requested.

III. The Claims Define Allowable Subject Matter

The Office Action rejects claims 3 and 4 under 35 U.S.C. §103 as unpatentable over U.S. Patent No. 5,274,289 to Wrobel (hereinafter "Wrobel") in view of U.S. Patent

No. 4,867,581 to Schmidt et al. (hereinafter "Schmidt"). The rejections are respectfully traversed.

The claimed invention enhances the coaxiality of bearings of a blower 1, wherein a shaft 11 rotating an impeller 17 is supported by two ball bearings 8, 9. In accordance with the claimed blower, wherein the impeller 17 is fixed to one end of the shaft 11, two ball bearings 8, 9, whose inner races 8b, 9b are smaller than their outer races 8a, 9a are inserted in a bearing box that is made of a resin from one direction. An inner race 8b of one of the ball bearings is pressed on the other bearing by a spring 14 that is interposed between a bush 13 and the inner race 8b to serve as a bearing for supporting the shaft. The outer races contact each other when the ball bearings are inserted in a bearing box. However, the inner races do not contact each other. As a result, the ball bearings rotate about their contact portions. Therefore, the two ball bearings are fixed in a position where the coaxiality relative to the shaft is the smallest, and hold that part by pressing the inner races with the spring to apply pre-load to them. Accordingly, the vibration of the shaft of the blower can be reduced because the coaxiality of the two bearings can be enhanced.

Schmidt discloses an external rotor motor having two axially spaced ball bearings. Schmidt also discloses that the two outer rings 32' and 42' axially contact each other while the inner rings 31' and 41' are separated by a spring washer 5'. As shown in Fig. 4 of Schmidt, the pre-load is applied to both inner rings 31' and 41' by the spring washer 5' interposed between the inner rings 31' and 41'.

However, in accordance with the claimed invention, the pre-load is applied to the inner ring 8b by the spring 14 that is interposed between the bush 13 and the inner race 8b. In accordance with the claimed invention, a distance of contact portions between the inner ring and a ball is larger than Schmidt, and as a result the rigidity of the shaft can be enhanced. Thus, Schmidt does not disclose the claimed blower.

Wrobel discloses an electric motor having two axially spaced ball bearings. Wrobel also discloses that the electric motor includes a spring 5 interposed between a rotor 13 and a

ball bearing 12a so as to apply a pre-load. However, Wrobel does not make up for the above deficiencies of Schmidt, and thus combining Wrobel with Schmidt does not result in the claimed blower.

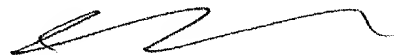
For at least these reasons, it is respectfully submitted that the claims are distinguishable over the applied art. Withdrawal of the rejection under 35 U.S.C. §103 is respectfully.

IV. Conclusion

For at least the reasons discussed above, it is respectfully submitted that this application is in condition for allowance.

Should the Examiner believe that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,



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Attachment:
Appendix

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>

APPENDIX

Changes to Claims:

Claim 3 is canceled.

Claim 5 is added.

The following is a marked-up version of the amended claim:

4. (Amended) In a blower which comprises an impeller fixed on one end of a shaft supported rotatably by bearings and a ring-like magnet provided inside the impeller, wherein the shaft and the impeller rotate due to a magnetic interference function between the magnet and a winding provided at a position of a stator corresponding to the magnet, which is supplied with a current,

the blower is characterized in that, in a resin-made bearing box, two ball bearings each having an inner race and an outer race, the inner race being narrower than the outer race, are inserted from one side of the blower,

a retainer ring is provided to one end of the shaft, another end of the shaft is secured to a bush fixed to center portion of a yoke, the retainer ring is contacted with the inner race of one ball bearing,

a spring is interposed between the bush and the inner race of the other ball bearing,

wherein the inner race of each of the ball bearings is mounted to the shaft so that coaxiality and position of the ball bearings are maintained in order by adjusting the position of each of the inner races through a displacement created between the outer surface of the shaft and the inner surface of the inner race abutting the outer surface of the shaft, the displacement created in relation to a gap which is formed between a side face of the inner races after the bearings are inserted in the bearing box in such a manner that a side face of the outer race of each of the bearings abut each other,

wherein one of the inner races of the two ball bearings is pushed with a the
spring toward the other ball bearing by applying pre-load.